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ATTORNEY DOCKET NO. **70030847-1**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Kee Yean Ng

Serial No.: 10/803,266 **Examiner:** Walford, Natalie K.

Filing Date: March 18, 2004 **Group Art Unit:** 2879

Title: DEVICE AND METHOD FOR EMITTING COMPOSITE OUTPUT LIGHT USING MULTIPLE WAVELENGTH-CONVERSION MECHANISMS

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on November 13, 2006 .

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) **$500.00**.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)(1)-(5)) for the total number of months checked below:

☐	one month	$ 120.00
☐	two months	$ 450.00
☐	three months	$1020.00
☐	four months	$1590.00

☐ The extension fee has already been filled in this application.

☒ (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account **50-3718** the sum of $500.00 . At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account **50-3718** pursuant to 37 CFR 1.25.

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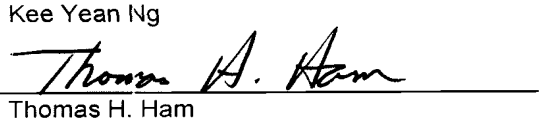
Respectfully submitted,

Kee Yean Ng

By 

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Attorney Docket No. 70030847-1 PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Kee Yean Ng Group Art Unit: 2879

Serial No. 10/803,266 Confirmation No. 5376

Filed: March 18, 2004 Examiner: Walford, Natalie K.

For: DEVICE AND METHOD FOR EMITTING COMPOSITE OUTPUT LIGHT USING MULTIPLE WAVELENGTH-CONVERSION MECHANISMS

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Alexandria, VA 22313-1450

BRIEF ON APPEAL

Sir/Madam:

This brief is in furtherance of Applicant's Notice of Appeal filed on November 13, 2006, appealing the decision of the Examiner dated August 14, 2006 finally rejecting claims 1-20.

I. Real Party in Interest

The real party in interest in this appeal is Avago Technologies ECBU IP (Singapore) Pte. Ltd., No. 1 Yishun Avenue 7, Singapore 768923.

II. Related Appeals and Interferences

There are currently no related appeals or interference proceedings in progress that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the present Appeal.

III. Status of Claims

Claims 1-20 were originally filed with the application on March 18, 2004. No claims have been amended, canceled, or added in response to any Office Action. Furthermore, no claims have been amended, canceled, or added for purposes of this Appeal.

Claims 1-20 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by U.S. Patent Application Publication No. US 2002/0043926 A1 ("Takahashi et al.").

This Appeal is made with regard to pending claims 1-20.

IV. Status of Amendments

No amendments were filed subsequent to final rejection.

V. Summary of Claimed Subject Matter

The claimed invention is a device and method for emitting composite output light. According to an embodiment of the invention, as recited in claim 1, a device for emitting composite output light comprises a light source (102) that

emits original light (Fig. 1; lines 14-21 on page 4 of the specification). The light source (102) includes a fluorescent layer (112) having a property to convert some of the original light into first converted light. (Fig. 1; lines 17-19 on page 4 of the specification; lines 30-32 on page 4 of the specification). The device further comprises a wavelength-conversion region (120) optically coupled to the light source (102) to receive some of the original light and the first converted light. (Fig. 1; lines 27-30 on page 5 of the specification; lines 9-13 on page 8 of the specification). The wavelength-conversion region (120) includes a fluorescent material (122) having a property to convert some of the original light into second converted light. (lines 30-32 on page 5 of the specification). The original light, the first light and the second converted light are components of the composite output light (lines 17-25 on page 8 of the specification).

According to another embodiment of the invention, as recited in claim 14, a device for emitting composite output light comprises a semiconductor die (102) that emits first light of a first peak wavelength (Fig. 1; lines 14-21 on page 4 of the specification; lines 27-31 on page 7 of the specification). The semiconductor die (102) includes a fluorescent substrate (112) having a property to convert some of the first light into second light of a second peak wavelength. (Fig. 1; lines 17-19 on page 4 of the specification; lines 30-32 on page 4 of the specification; lines 10-14 on page 7 of the specification). The device further comprises a wavelength-conversion region (120) positioned to receive at least some of the first light and the second light. (Fig. 1; lines 27-30 on page 5 of the specification; lines 9-13 on page 8 of the specification). The wavelength-conversion region (120) has a property to convert some of the first light into third light of a third peak wavelength. (lines 30-32 on page 5 of the specification; lines 1-14 on page 7 of the specification). The first light, the second light and the third light are components of the composite output light (lines 17-25 on page 8 of the specification).

According to an embodiment of the invention, as recited in claim 8, a method for emitting composite output light comprises generating original light

within a light source (Fig. 2; lines 19-21 on page 4 of the specification; lines 27-30 on page 7 of the specification), converting some of the original light into first converted light within the light source (Fig. 2; lines 30-32 on page 4 of the specification; lines 31-33 on page 7 of the specification), converting some of the original light into second converted light outside of the light source (lines 30-32 on page 5 of the specification; lines 13-16 on page 8 of the specification), and emitting the original light, the first converted light and the second converted light as components of the composite output light (lines 17-25 on page 8 of the specification).

VI. Grounds of Rejection to be Reviewed on Appeal

Whether claims 1-20 are anticipated under 35 U.S.C. 102(b) by Takahashi et al.

VII. Argument

A. Rejection of Independent Claim 1 Under 35 U.S.C. §102(b)

In the Final Office Action of August 14, 2006, the Examiner has rejected the independent claim 1 under 35 U.S.C. §102(b) as allegedly being anticipated by Takahashi et al. However, the cited reference of Takahashi et al. does not disclose every claimed element of the independent claim 1. In particular, the cited reference of Takahashi et al. does not disclose both "*a light source... including a fluorescent layer*" and "*a wavelength-conversion region optically coupled to said light source*," as recited in the independent claim 1. Thus, the independent claim 1 is not anticipated by the cited reference of Takahashi et al.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

On page 2 of the Final Office Action, the Examiner states that the Takahashi et al. discloses "a light source (FIG. 1, item 10) that emits original light, the light source including a fluorescent layer (FIG. 6A, item 37)" and "a wavelength-conversion region (FIG. 1, item 35) optically coupled to the light source." However, the cited reference of Takahashi et al. does not explicitly disclose a device that includes both a light source including a fluorescent layer and a wavelength-conversion region, as recited in the independent claim 1. Thus, the Examiner asserts on page 6 of the Final Office Action that the cited reference of Takahashi et al. "discloses that the wavelength conversion region (item 35) '**CAN BE OMITTED**' (paragraph 97) with the fluorescent layer (item 37)" and that the cited reference of Takahashi et al. "teaches that the wavelength conversion region can be kept since it can be omitted."

The cited reference of Takahashi et al. states in paragraph [0097] that "[i]n the LED unit 1, a fluorescent layer 37 with which the substrate surface of the light-emitting device 10 is covered maybe provided as shown in FIG. 6A or 6B **so that the fluorescent resin 35 can be omitted**" (emphasis added). Clearly, when read in its entirety, the above sentence implies that the fluorescent layer (37) is provided to replace the fluorescent resin (35). Such interpretation is further supported by the fact that Takahashi et al. in paragraph [0098] states that "[a] light-transmissible material (such as epoxy resin, silicone resin, urea resin, glass or the like) containing the fluorescent materials 36 dispersed therein can be used as the fluorescent layer 37." No other possible fluorescent material is disclosed. The use of the same fluorescent materials (36) in both the epoxy resin (35) and the fluorescent layer (37) suggests that these two elements are alternatives since having both the epoxy resin (35) and the fluorescent layer (37) would be redundant and unnecessary. Therefore, the cited reference of Takahashi et al. does not disclose both "*a light source... including a fluorescent layer*" and "*a wavelength-conversion region optically coupled to said light source*," as recited in the independent claim 1. Consequently, the independent claim 1 is not anticipated by the cited reference of Takahashi et al.

B. Rejection of Independent Claim 8 Under 35 U.S.C. §102(b)

In the Final Office Action, the Examiner has rejected the independent claim 8 under 35 U.S.C. §102(b) as allegedly being anticipated by Takahashi et al. However, the cited reference of Takahashi et al. does not disclose every claimed element of the independent claim 8. In particular, the cited reference of Takahashi et al. does not disclose "*converting some of said original light into first converted light within said light source*," as recited in the independent claim 8. Furthermore, the cited reference of Takahashi et al. does not disclose both "*converting some of said original light into first converted light within said light source*" and "*converting some of said original light into second converted light outside of said light source*," as recited in the independent claim 8. Thus, the independent claim 8 is not anticipated by the cited reference of Takahashi et al.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

On page 3 of the Final Office Action, the Examiner alleges that the Takahashi et al. discloses "converting some of the original light into first converted light within the light source (page 4, paragraph 62)." However, in paragraph [0062] of Takahashi et al., there is no mention of converting light within a light source. Rather, paragraph [0062] discloses wavelength conversion by fluorescent material, which is used in an epoxy resin within a cup portion 33 of the LED unit 1, as shown in Fig. 1, or in the fluorescent layer 37, as shown in Fig. 6A. Since the fluorescent material is not described in Takahashi et al. as being used in the light source, i.e., the light-emitting device 10, the limitation of "*converting some of said original light into first converted light within said light source*," as claimed in the independent claim 8, is not disclosed in the cited reference of Takahashi et al.

Furthermore, as explained above in Section A of this Appeal Brief, the cited reference of Takahashi et al. does not disclose a device that includes both a light source including a fluorescent layer and a wavelength-conversion region. Therefore, the cited reference of Takahashi et al. cannot disclose both "*converting some of said original light into first converted light within said light source*" and "*converting some of said original light into second converted light outside of said light source*," as recited in the independent claim 8. Consequently, the independent claim 8 is not anticipated by Takahashi et al.

C. Rejection of Independent Claim 14 Under 35 U.S.C. §102(b)

In the Final Office Action, the Examiner has rejected the independent claim 14 under 35 U.S.C. §102(b) as allegedly being anticipated by Takahashi et al. However, the cited reference of Takahashi et al. does not disclose every claimed element of the independent claim 14. In particular, the cited reference of Takahashi et al. does not disclose "*a light source... including a fluorescent substrate,*" as recited in the independent claim 14. Thus, the independent claim 14 is not anticipated by the cited reference of Takahashi et al.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

On page 4 of the Final Office Action, the Examiner states that the cited reference of Takahashi et al. discloses "a semiconductor die (FIG. 1, item 10) that emits first light of a first peak wavelength, the semiconductor die including a fluorescent substrate (FIG. 6A, item 37)."

However, the referenced item (37) described in Takahashi et al. is not a substrate, as asserted by the Examiner. The cited reference of Takahashi et al. states in paragraph [0097] that "a fluorescent layer 37 with which the substrate

surface of the light-emitting device 10 is covered maybe provided as shown in FIG. 6A or 6B so that the fluorescent resin 35 can be omitted." In addition, the cited reference of Takahashi et al. further states in paragraph [0097] that "FIG. 6A shows the case where only the substrate surface of the light-emitting device 10 is covered with the fluorescent layer 37." In Fig. 6A, the fluorescent layer (37) is shown to be positioned below the item (11). The item (11) is referred to as the substrate of the light-emitting device (10) in paragraph [0068] of Takahashi et al. Thus, the description in paragraph [0097] of Takahashi et al. clearly indicates that the fluorescent layer (37) is not a substrate, but rather a layer covering the substrate (11) of the light-emitting device (10). Consequently, the cited reference of Takahashi et al. does not disclose "*a semiconductor die... including a fluorescent substrate,*" as recited in the independent claim 14. Thus, the independent claim 14 is not anticipated by Takahashi et al.

D. Rejection of Dependent Claims 2-7, 9-13 and 15-20 Under 35 U.S.C. §102(b)

The dependent claims 2-7, 9-13 and 15-20 were rejected under 35 U.S.C. §103(a) as allegedly being anticipated by the cited reference of Takahashi et al. However, every element of these dependent claims 2-7, 9-13 and 15-20 is not disclosed by Takahashi et al.

Each of the dependent claims 2-7, 9-13 and 15-20 depends on one of the independent claims 1, 8 and 14. As such, these dependent claims include all the limitations of their respective base claims. Therefore, the dependent claims 2-7, 9-13 and 15-20 are not anticipated by Takahashi et al. for at least the same reasons as their respective base claims.

SUMMARY

The pending claims 1-20 are not anticipated by the cited reference of Takahashi et al. In particular, the cited reference of Takahashi et al. does not disclose both "*a light source... including a fluorescent layer*" and "*a wavelength-conversion region optically coupled to said light source,*" as recited in the independent claim 1. In addition, the cited reference of Takahashi et al. does not disclose "*converting some of said original light into first converted light within said light source*," as recited in the independent claim 8. Moreover, the cited reference of Takahashi et al. does not disclose both "*converting some of said original light into first converted light within said light source*" and "*converting some of said original light into second converted light outside of said light source*," as recited in the independent claim 8. Furthermore, the cited reference of Takahashi et al. does not disclose "*a light source... including a fluorescent substrate,*" as recited in the independent claim 14. Therefore, the independent claims 1, 8 and 14, as well as the dependent claims 2-7, 9-13 and 15-20, are not anticipated by Takahashi et al.

For all the foregoing reasons, it is earnestly and respectfully requested that the Board of Patent Appeals and Interferences reverse the rejections of the Examiner regarding claims 1-20, so that this case may be allowed and pass to issue in a timely manner.

Respectfully submitted,
Kee Yean Ng

Date: January 16, 2007

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VIII. Claims Appendix

1. A device for emitting composite output light, said device comprising:

a light source that emits original light, the light source including a fluorescent layer having a property to convert some of said original light into first converted light; and

a wavelength-conversion region optically coupled to said light source to receive some of said original light and said first converted light, said wavelength-conversion region including a fluorescent material having a property to convert some of said original light into second converted light, said original light, said first light and said second converted light being components of said composite output light.

2. The device of claim 1 wherein said light source is a light emitting diode die and wherein said fluorescent layer is a substrate of said light emitting diode die.

3. The device of claim 1 wherein said fluorescent material of said wavelength-conversion region includes at least one of fluorescent organic dye, inorganic phosphor and nano-phosphor.

4. The device of claim 1 wherein said fluorescent material of said wavelength-conversion region includes fluorescent particulates to scatter said original light and said first converted light that propagate through said wavelength-conversion region.

5. The device of claim 1 wherein said wavelength-conversion region is configured to substantially enclose said light source over a surface on which said light source is positioned.

6. The device of claim 5 wherein said wavelength-conversion region is positioned on said light source such that said light source is covered by said wavelength-conversion region.

7. The device of claim 1 wherein said wavelength-conversion region is configured as a planar layer positioned over said light source.

8. A method for emitting composite output light, said method comprising:

generating original light within a light source;

converting some of said original light into first converted light within said light source;

converting some of said original light into second converted light outside of said light source; and

emitting said original light, said first converted light and said second converted light as components of said composite output light.

9. The method of claim 8 wherein said generating of said original light includes generating said original light within an active layer of a light emitting diode die.

10. The method of claim 9 wherein said converting of said original light into said first converted light includes converting said original light into said first converted light at a fluorescent substrate of said light emitting diode die.

11. The method of claim 8 wherein said converting of said original light into said second converted light includes converting said original light into said second converted light at a wavelength-conversion region optically coupled to said light source.

12. The method of claim 11 wherein said converting of said original light into said second converted light includes converting said original light into said second converted light using fluorescence.

13. The method of claim 12 wherein said converting of said original light into said second converted light includes scattering said original light and said first converted light propagating through said wavelength-conversion region.

14. A device for emitting composite output light, said device comprising:

a semiconductor die that emits first light of a first peak wavelength, said semiconductor die including a fluorescent substrate having a property to convert some of the first light into second light of a second peak wavelength; and

a wavelength-conversion region positioned to receive at least some of said first light and said second light, said wavelength-conversion region having a property to convert some of said first light into third light of a third peak

wavelength, said first light, said second light and said third light being components of said composite output light.

15. The device of claim 14 wherein said semiconductor die is a light emitting diode die.

16. The device of claim 14 wherein said wavelength-conversion region includes at least one of fluorescent organic dye, inorganic phosphor and nano-phosphor.

17. The device of claim 14 wherein said wavelength-conversion region includes fluorescent particulates to scatter said first light and said second light that propagate through said wavelength-conversion region.

18. The device of claim 14 wherein said wavelength-conversion region is configured to substantially enclose said semiconductor die over a surface on which said semiconductor die is positioned.

19. The device of claim 18 wherein said wavelength-conversion region is positioned on said semiconductor die such that said semiconductor die is covered by said wavelength-conversion region.

20. The device of claim 14 wherein said wavelength-conversion region is configured as a planar layer positioned over said semiconductor die.

IX. Evidence Appendix

NONE

X. Related Proceedings Appendix

NONE